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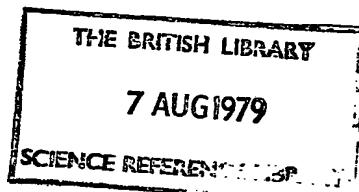
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COMPLETE SPECIFICATION

(54) IMPROVEMENTS IN OR RELATING TO CLOSURE SEALS



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The present invention relates to improvements in so-called pilferproof closure seals for containers having externally screw-threaded necks, such as are disclosed in Patent Specification No. 25881.

The well-known pilferproof closure seal is applied to an externally screw-threaded bottle by a rolling process and is formed of a shell of thin ductile metal, such as light gauge aluminium. It has a top and skirt which is thread-rolled into engagement with thread on the bottle neck during application to a bottle, and a security band, which, in application to the bottle, is rolled into engagement under a rib on the bottle neck to act as a locking ring. An interrupted slit line forms a boundary between the skirt and the security band so that they are connected to each other only by a series of angularly spaced bridges. When a sufficient torque is applied to the upper part of the closure in the unscrewing direction, the bridges rupture, leaving the security band anchored under the rib on the bottle neck.

Where the security band is left on the bottle neck after unscrewing, the removal of the security band adds an extra expense in the recovery of the bottle for reuse. Various proposals have been put forward to ensure that the security band separates automatically from the bottle when the cap is first unscrewed.

In Patent Specification No. 25881, one of the bridges connecting the security band is substantially stronger than any of the other bridges and a weakening line extends transversely across the security band to meet the circumferentially extending slit line at a narrow gap.

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between the strong bridge and another bridge very close to it.

The single weakening line in the security band is usually a slit. In normal operation all the bridges (with the exception of the strong bridge) break during the unscrewing of the closure seal, so that, at the end of the unscrewing operation, the security band is connected to the closure skirt by a single strong bridge.

In exceptional cases, however, breakage of the strong bridge is experienced during unscrewing, with the result that the security band is left on the neck of the bottle. Although this difficulty could be overcome by increasing the width of the strong bridge, that is found to lead to increasing resistance to unscrewing. However, usually at the end of the unscrewing operation, the free end of the security band is definitely separated from the lower edge of the skirt and the band is somewhat deflected so that the breakage of the bridges is readily apparent.

In a different arrangement, a large number of, usually eight, weakening lines have been provided in the security band. On unscrewing, the security band bursts all, or most, of these weakening lines, whilst all, or nearly all, the bridges remain intact. Although that arrangement avoids the possibility of a ring being left on the bottle neck, it suffers from the severe disadvantage that the separate sections of the security band hinge outwardly without downward deflection of one end in relation to the other. The separate sections can easily be reengaged with the bottle neck after opening and such reengagement is relatively difficult to detect, so that this arrangement is not really pilferproof.

It is an object of the present invention to provide a closure which is not open to either objection and for this purpose it is proposed in a preferred embodiment to provide a pilferproof seal in which there are at least two diametrically opposed slits in the security band. An arrangement of that type has already been proposed in earlier patents, but in the present case the bridges in the slit line adjacent the top end of each

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weakening line or slit in the security band are arranged following the principles of Patent Specification No. 25881.

According to the present invention, there is provided a pilerproof closure of the type having a shell formed of thin ductile metal and having a top and a skirt and a security band connected to the skirt by a series of angularly spaced bridges in a circumferentially extending slit line characterised in that the security band is provided with a plurality of transverse weakening lines at regular intervals, each section of the security band between two weakening lines being secured to the skirt by bridges, comprising a relatively strong bridge at one end, a relatively weak bridge at the other end in close proximity to the relatively strong bridge of the adjacent section and at least one relatively weak bridge between said relatively strong and relatively weak bridges. The security band is thus divided into two or more equal sections, each of which is connected to the skirt of the closure shell by a series of spaced bridges. Should one of the strong bridges become broken during unscrewing, the separated section of the security band does not require special removal from the bottle neck.

It is preferred that the security band be transversely slit at two diametrically opposed positions. However, it may be slit at three or even four positions, in accordance with the invention. Where it is slit at two positions, it is found convenient for each half of the security band to be connected to the closure shell by four normal (i.e. relatively weak) bridges, which are preferably all of the same size, and one strong bridge which is appreciably wider than the normal bridges, the spacing between each of these bridges being substantially equal and much greater than the narrow gap between each strong bridge and the adjacent normal bridge.

Whereas in the closure described in Patent Specification No. 25881 it has been found convenient to place the strong bridge to the right of the line of weakening (viewing the closure in side elevation and with

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the top uppermost) it has been found more convenient with the closure of the present invention to place the strong bridge to the left of the weakening line, so that it is at the leading end of a half of the security band during the unscrewing operation.

One construction of closure made in accordance with the invention is hereinafter described with reference to the accompanying drawings wherein:

Figure 1 is a view of a closure, partly in section in the unapplied condition,

Figure 2 is a view of the closure applied to a bottle top, and

Figure 3 is a section on line A-A of Figure 1.

The closure seal takes the form of a metal shell, in the top end of which any form of gasket may be placed. The metal shell is made as a pressing from light gauge aluminium container sheet and comprises a top 1 and a skirt 2 and a security band 3. A ring of knurling 4 acts as a grip to facilitate removal. A plain cylindrical zone 5 is adapted to be rolled into engagement with thread on the neck of the bottle to which the closure seal is to be applied.

At the junction between the skirt and the security band there is a slight protuberance 6 and in this is cut a series of aligned slits 7, arranged so as to leave bridges in the known way. The comparative size and disposition of the bridges is shown in Figure 3, where it will be seen that there are normal bridges 8, separated from each other by slits 7 of equal length. The special feature of the invention lies in the provision of stronger bridges 9 which are separated from adjacent bridges 8a by a narrow gap.

Conveniently the narrow gap between a bridge 9 and an adjacent bridge 8a is constituted by no more than the width of a vertical cut line 11. Each bridge 9 may be separated from adjacent bridge 8a by a definite, but short, horizontal slit, but that is unnecessary. Whilst

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all the bridges 8, 8_a are conveniently of the same size, that is not essential to the invention. The bridges 9 must be larger than the other bridges.

A small bridge 12 may be left near the bottom end of the cut line 11. Such bridge is automatically broken by the application rollers in the course of tucking the bottom margin of the security band under the collar on the bottle neck. It is preferred that the material of the security band should be cut through completely on the line 11 (except for bridge 12). However, if the remaining thickness is no more than 0.025 mm a weakening line will open substantially as easily as a cut line and for the present purpose is considered as a cut.

Where the closure is to be employed to hold liquids under pressure, such as beer and carbonated beverages, the closure is provided with a gasket in the angle between top 1 and skirt 2 having a thickened peripheral annulus and is brought into sealing engagement with the side sealing surface on the bottle as shown in British Patent Specification No. 975,739.

Although the strong bridges 9 are preferably to the left of the immediately adjacent cut line 11 as shown in the drawings they may be positioned to the right of it.

When the closure is unscrewed the bridges 8 most remote from the bridges 9 break first. The remaining bridges then break progressively, the bridges 8_a being the last to break. Normally both bridges 8_a break, although occasionally only one bridge 8_a does so; both bridges 9 remain unbroken. It is impossible for the security band to remain on the bottle neck and the fact that the bottle has been opened is clearly visible through the breakage of at least four (and probably more) of the bridges.

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CLAIMS:

1. A pilferproof closure of the type having a shell formed of thin ductile metal and having a top and a skirt and a security band connected to the skirt by a series of angularly spaced bridges in a circumferentially extending slit line characterised in that the security band is provided with a plurality of transverse weakening lines at equiangular intervals, each section of the security band between two weakening lines being secured to the skirt by bridges, comprising a relatively strong bridge at one end, a relatively weak bridge at the other end in close proximity to the relatively strong bridge of the adjacent section and at least one relatively weak bridge between said relatively strong and relatively weak bridges.
2. A closure according to claim 1, in which the security band is cut transversely at two diametrically opposed positions to form said transverse weakening lines.
3. A closure according to claim 1 or 2, in which the relatively strong bridge at the end of one section is separated from the relatively weak bridge at the end of the adjacent section only by the width of a transverse cut in the security band.
4. A closure according to any preceding claim, in which each strong bridge lies to the left of the adjacent transverse weakening line, when the closure is viewed in side elevation and with the top uppermost.
5. A pilferproof closure constructed and adapted to operate substantially as herein described with reference to the accompanying drawings.

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AGENTS FOR THE APPLICANTS

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METAL CLOSURES LIMITED

1 Sheet

FIG. 1

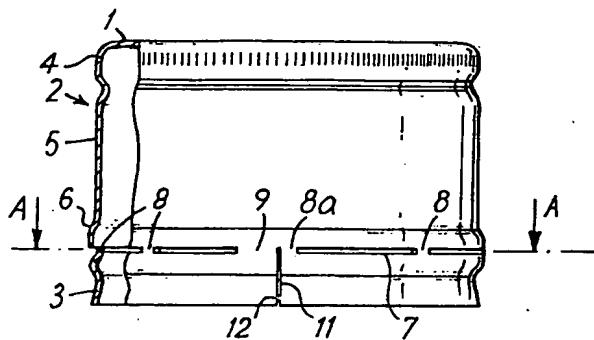


FIG. 2

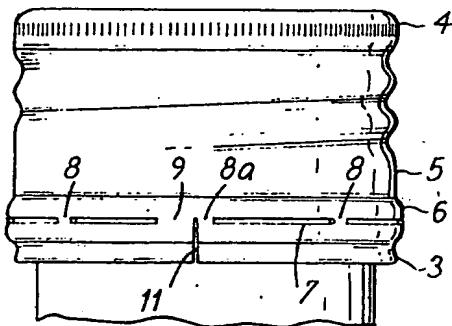
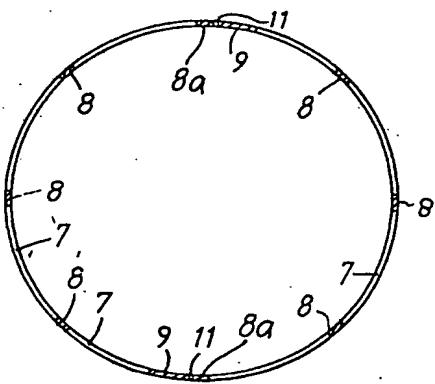


FIG. 3



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